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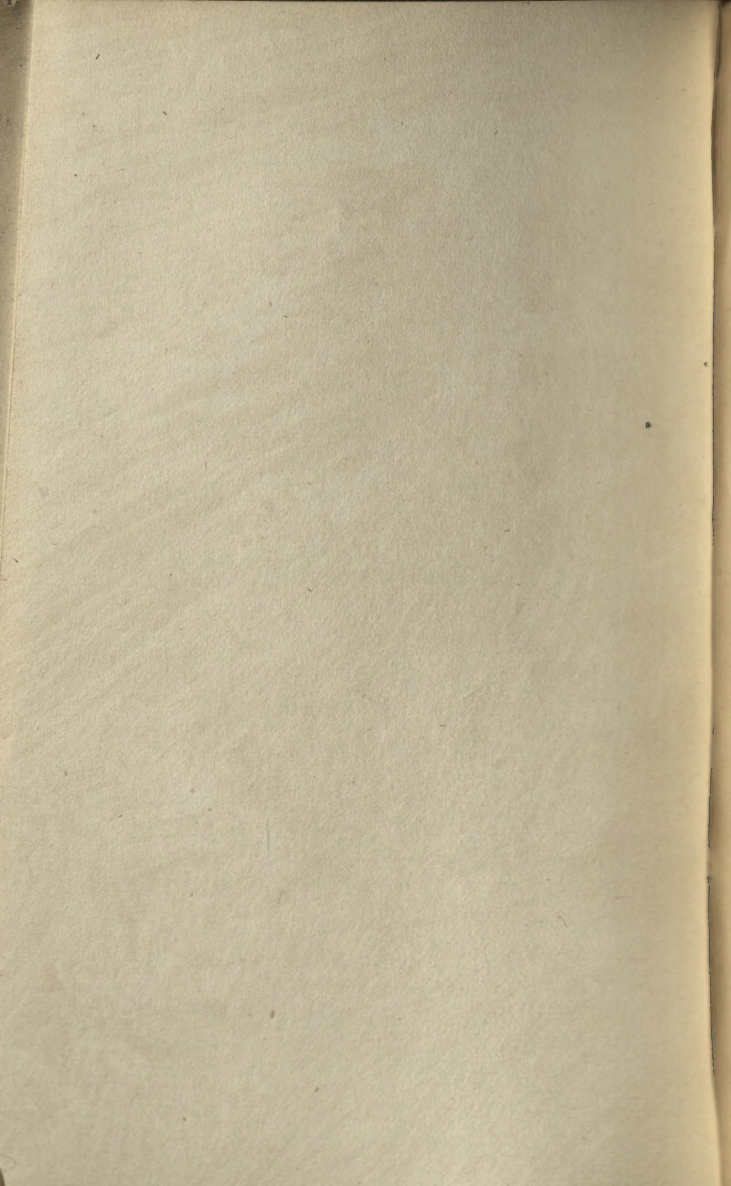
BRIEF DIRECTIONS  
FOR PRODUCING  
PHOTOGRAPHIC PICTURES,  
BY THE  
COLLODION PROCESS.

BY  
J. BOWYER.

LONDON:  
C. BAKER, 244, HIGH HOLBORN,  
OPPOSITE DAY AND MARTIN'S.  
W. BOLTON, 146, HOLBORN BARS.

1853.

*Price One Shilling.*



*Francis Bedford.*

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ROBERT HARDWICKE, PRINTER, CAREY STREET,  
LINCOLN'S INN.



## P R E F A C E.

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It is not my intention in this slight sketch to trace the history of Photography, nor to attempt an explanation of the philosophical principles on which its results are based ; but simply to describe one particular process in such a manner as will enable any person, unaccustomed to chemical manipulations, to follow it out successfully.

With this view I will avoid perplexing the reader with an account of the numberless modifications which have been suggested, and only place before him a detail of that mode of operating, which I have practically found to be the best.

Some difficulties will necessarily obstruct the student's path, which no written instructions can enable him to overcome ; but ordinary care, and a little practice, will suffice for their removal.

J. BOWYER.

*July, 1853.*



## THE COLLODION PROCESS.

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HAVING procured some pieces of patent plate glass, cut to the size of your camera frame, proceed to clean them in the following manner; soak a few towels, a skin of wash-leather, and an old cambric handkerchief, in a basin of water containing a small quantity of soda, in solution, (about one drachm to a pint of water,) well rinse them in plain water, and dry them; these must be kept for the purpose of cleaning your glass plates, as towels, &c., washed in the ordinary way, always contain a small quantity of soap, which is just the thing you must avoid. Glass when obtained fresh from the cutters, is usually greasy, and marked with soap; to remove this, put all the plates together, in a basin of water, containing some soda in solution, (as before) pick them out one by one, and while wet rub them well either



with your fingers, or a piece of cotton; rinse them in plain water, and dry them with one of the prepared towels. The glass plates are now moderately clean, but if used in this state, small spots are apt to appear on the picture; it is better, therefore, to subject them to a further process, although at the expense of a little extra trouble. Mark one side of the glass by scratching the corner with a piece of flint, or a diamond; then rub the marked side with a piece of cotton, impregnated with a few drops of the following mixture: nitric acid one part, water two parts, and sufficient Tripoli powder to render it as thick as cream. (The Tripoli removes any mechanical impurities, and the nitric acid any chemical ones, that may remain on the glass.) Then hold the plate under a tap, and allow a stream of water to flow over it, in order to remove all the Tripoli, and wipe it dry, with one of the clean towels. The glasses being thus prepared, should be packed up in paper until required.

When about to take a picture, it is necessary that nearly all the operations should be conducted in a room from which white light is carefully excluded; the most convenient plan of doing this is, by hanging before the window a blind



formed of two or three thicknesses of yellow paper, or cotton, as the light thus admitted exercises no perceptible effect on Photographic preparations, yet is sufficient to enable the operator to see what he is doing. Having taken all your apparatus, excepting the camera, into this room, polish one of the clean glass plates with the leather, and then with the cambric handkerchief remove from its marked surface, any particles of dust that the electricity excited by rubbing with the leather has caused to adhere to it. Remove from the neck of the collodion bottle any dust or particles of dry collodion that may be found sticking to it, otherwise in pouring the fluid, they would be carried with it on to the plate, and cause those comet-like marks by which pictures are frequently disfigured.

Hold the glass by one corner with the thumb and finger of the left hand, in a horizontal position, with the marked side upwards; take the collodion bottle in the right hand, and pour from it on to the plate a gentle stream, at the same time inclining the plate dexterously, in such a manner as to cause the collodion to flow completely over its surface: then by depressing one of the corners, allow the superfluous fluid to drain back

into the bottle, at the same time moving the plate backwards and forwards, or as it were rocking it, over the mouth of the bottle, in order that the furrows formed by the collodion flowing off, may run one into the other, and thus produce an even film.

When the collodion has become sufficiently dry, which may be known by the film assuming a perfectly smooth appearance, the plate must be immersed in the bath, containing a solution of nitrate of silver, in the proportion of thirty grains, to one ounce of distilled water:<sup>1</sup> care must be taken that this immersion of the plate is performed with a steady uninterrupted motion, as every stoppage made in so doing, will produce a line across the picture; it must now be allowed to remain undisturbed for at least a minute, and during that time, go to your camera, and carefully adjust your focus to the object you propose depicting.<sup>2</sup> This having been done, return to your operating room, and raise the plate (which has now assumed a milky appearance) out of the bath, and re-dip it gently several times, until the nitrate of silver solution flows evenly over its surface; hold it with one corner downwards, that all the superfluous fluid may run off, and then

place it in the dark frame, with the collodion side towards the sliding shutter, and take it to the camera, place the brass cap over the front of the lens, withdraw the ground glass screen, and slide the dark frame into its place, draw up the shutter, remove the cap from the lens, and when the plate has been exposed for a sufficient length of time, replace the cap, slide down the shutter, and remove the dark frame into the operating room, take out the plate, on which no image is visible, and place it collodion side upwards, on the level stand, and pour over it a sufficient quantity of the following solution to cover its surface ; a plate 3in. by 4in. requires about a drachm and a half.

Distilled water	3oz.
Acetic acid	1 drachm.
Pyrogallic acid	3 grains.
Nitric acid	1 minim.

The best method of applying this solution, is to put the requisite quantity into a small 1oz. measure, and from this pour it gently on to one corner of the collodion surface, at the same time slightly tilting the plate with one finger, in order to make it flow quickly and evenly ; if this is not done neatly, stains are apt to appear on the picture. By holding a piece of white paper beneath



the plate, the image may be seen gradually developing itself; when the details of the picture have become distinct, pour the solution from off its surface, and apply in the manner just described, a similar quantity of a saturated solution of the hyposulphite of soda, this will remove the clouded appearance of the picture, and render it much more transparent; allow this solution to remain on the plate at least half a minute, and then pour it back into the bottle from which it was taken, never throw it away, as it becomes improved by use, but occasionally add some more hyposulphite of soda, so that a few crystals may remain undissolved at the bottom of the bottle, thus keeping the solution always saturated.<sup>3</sup>

The picture must now be well washed, by pouring on to the centre of the plate as much water as it will hold, allowing it to remain on a few seconds, and then pouring it away; this must be repeated several times, and then a small stream of water may be allowed to flow over it, in order to remove all traces of the hyposulphite, care being taken by pouring the water always on the centre of the plate, to avoid disturbing the film of collodion. The plate may now be set up on its edge to dry.<sup>4</sup> When the film of collodion

on the plate has become dry, cover its surface with a coating of amber varnish; this must be done by pouring on the varnish in the same manner that was adopted for applying the collodion. The amber varnish to be employed is not that sold by the varnish makers, it is manufactured specially for this purpose, by macerating amber in chloroform. When this varnish is dry, apply in the same manner, a coating of black japan, and the picture is completed.

A picture having quite a different tone of colour may be produced, by using a solution of the protonitrate of iron as a developing fluid, instead of the pyrogallic solution already described. The best method of preparing it is that recommended by Dr. Diamond, viz., Dissolve 300 grains of nitrate of baryta, in 3oz. of boiling water, then add to it 320 grains of the protosulphate of iron in powder, stir it up well, and when all dissolved, separate the fluid (which is the protonitrate of iron) by filtration. When freshly made it is of a pale green colour, but it will only keep for a few days; as soon as it begins to deposit a sediment and change colour, it may be thrown away, as it is then useless. The mode of using it is as follows: When the plate has

been removed from the dark frame and placed on the level stand, pour into a measure the requisite quantity of the protonitrate of iron, ( $1\frac{1}{2}$  drachms for a plate 3in. and 4in.) and add to it a small quantity of the pyrogallie acid solution previously described, in the proportion of 10 or 12 drops to the drachm of protonitrate; mix the two fluids by stirring with a glass rod, and then pour the mixture over the surface of the plate, as quickly and evenly as possible. When the picture is developed, the solution must be poured off, and hyposulphite of soda applied, and the plate well washed and varnished, in the manner already explained.

The protonitrate of iron solution may be employed without the addition of any pyrogallie acid. The resulting picture will very much resemble a Daguerreotype, the silver being precipitated on the glass with all its metallic brilliancy.

Thus far I have described the method of taking pictures which, when finished, represent the lights and shades of the objects depicted in their natural order; they are usually denominated positive pictures. The collodion process, however, presents equal facilities for producing negatives;



that is to say, pictures in which on looking through them, the order of light and shade is inverted, and from which any number of positives may be produced on paper. The method of doing this I will now describe. To obtain the negative picture, prepare your glass plate, cover it with collodion, immerse it in the nitrate of silver bath, expose it to the action of light in the camera, and then place it on a level stand, and pour over it some of the following developing solution, in the manner already described:—

Distilled water	3oz.
Acetic acid	$\frac{1}{2}$ drachm.
Pyrogallic acid	3 grains.

When the picture is fully developed, pour over it some of the saturated solution of hyposulphite of soda, and then well wash it, and set it up on its edge to dry. The entire process up to this point, is precisely the same as that described for producing positive pictures, with the exception of a slight variation of the developing solution, and all the details of manipulation must be conducted in a precisely similar manner, and with an equal amount of care; should the negative not be sufficiently intense, it may be considerably improved by pouring over it, before it is

quite dry, some of the following solution :—

Distilled water 1oz.

Hydrochlorate of ammonia 3 grains.

Chloride of gold<sup>5</sup> 3 grains.

When this has sufficiently darkened the shadows of the picture, the superfluous quantity may be returned to the bottle from which it was taken, and the plate washed and dried. When dry, the negative should be varnished with the amber varnish, and it is then ready for printing the paper positives.

The best paper is that manufactured expressly for the purpose by Canson Frères; to prepare it, proceed as follows: Examine each sheet by a strong light, one side will be found perfectly smooth, the other bearing slight traces of the metallic cloth on which it has been made, mark the smooth side with a pencil cross in each corner. Fill a shallow porcelain dish to about the depth of a quarter of an inch, with a solution of hydrochlorate of ammonia, in the proportion of 10 grains to 1oz. of distilled water, Then take a piece of the paper a little smaller than the dish, and lay it floating on the solution,<sup>6</sup> with its marked side downwards, being careful that there are no air bubbles between the paper and the

fluid ; allow it to remain until it ceases to curl upwards, then remove it, and hang it up by one corner to dry. Any number of sheets may be prepared in this manner, as they will keep unimpaired for an indefinite period. To render this paper sensitive to the action of light, it must be taken into the room with the yellow blind, or into one illuminated by a candle, and there floated in the manner just described, with the marked side downwards, on a solution of nitrate of silver, in the proportion of 75 grains to 1oz. of distilled water ; it must remain on this solution until it ceases to curl upwards, and then be removed and hung up in the dark to dry. When quite dry, it may be placed in a portfolio, and preserved from the action of light, but it will not keep more than two or three days.

To obtain a copy from a negative, remove the back of the pressure frame, place the negative plate inside it with the collodion side upwards, on this put a piece of prepared paper with the marked side towards the glass, and then put in the back of the frame, and screw it up tightly, and expose it to the direct rays of the sun ; the back of the frame being jointed, one half can be raised from time to time, and the paper partially



lifted from the negative to watch the development of the picture, which should be allowed to assume a much darker tint than it is intended to bear when finished; for instance, those portions intended to appear white, should be allowed to become of a violet colour. When the paper has become sufficiently dark it must be removed from the pressure frame, and placed in a basin of water. After it has soaked for about five minutes, take it out, and remove all superfluous moisture by pressing it between some clean pieces of blotting paper, and then immerse it in some of the following solution:—

Distilled water	6oz.
Hyposulphite of soda	1oz.
Chloride of silver <sup>7</sup>	1 drachm.
Chloride of gold	3 grains.

In this it should remain at least half an hour; the picture will then have assumed a dark brown tint, and if that is the colour desired, it may be removed; if allowed to remain longer, it will gradually become of a violet tint, and from that will pass to a black, and then to a yellow tone. When it has thus reached the desired colour, remove it from the solution, and place it in some clean water; this must be repeatedly

changed, and the picture soaked, until on allowing a drop of the water to fall on the tongue, from one corner of the paper, no sweet taste is perceptible, it may then be hung up to dry. Its appearance will be very much improved, if before it is quite dry, it is placed between two pieces of smooth paper, and then pressed with a warm iron.

As the effect of a picture must obviously be in a great measure dependent on a judicious arrangement of the object to be copied, a few suggestions on that point may not be out of place. Assuming that the student is about to take a portrait from life, where the advantage of a glass room cannot be obtained, the sitter should be placed in the open air, in such a position as to be shaded from the direct rays of the sun, but not immediately under a tree. Hang up behind him a blanket, or some material of that tint, to form a back ground in the picture; suspend over his head a piece of blue cotton, in the form of a canopy, to prevent the top light producing heavy shadows from the projecting parts of the face, and spread out a white table cloth, or anything of that description at his feet. The face should be turned a little to one side, a three-quarter face,

as it is termed, is usually the most favourable position ; if the hands are intended to be represented in the picture, they must be kept as close to the body as possible, otherwise they will appear very much distorted ; a head-rest attached to the chair in which the sitter is placed is a great convenience, as it prevents his involuntarily altering his position. These arrangements being all completed, the camera must be placed opposite the person whose portrait is to be taken, and moved either backwards or forwards, until his image appears on the ground glass screen, the size you wish it to be depicted ; then adjust the focus by turning the milled head attached to the lens, until his eye is seen sharply defined. This being done, the camera is ready to receive the prepared glass plate. If in the finished picture one side of the face appears too much in the shade, it may be remedied in the next attempt, by hanging up any white material as a screen, at about a distance of three feet from the side of the face which is too dark, to reflect the light upon it.

The length of time during which the plate must be exposed in the camera to the action of light, cannot be definitely stated ; it is influenced by many contingencies ; the time of day, the time



of year, the clearness of the atmosphere, &c., &c. To give some idea of the requisite time, I may say that, to obtain a portrait on a bright day in the summer, between the hours of six in the morning, and four in the afternoon, an exposure of from one to three seconds only would be requisite ; should the day be cloudy, perhaps ten seconds might be found necessary ; and in the winter months, thirty or forty seconds will be required. When operating for a negative picture, the exposure should be nearly double the time required to produce a positive. The action of the light is usually most energetic in the early part of the day ; and after three o'clock in the winter, and five o'clock in the summer afternoon, good results are very seldom obtained.

The effects of a too short, or of a too prolonged exposure, are rendered evident after the hyposulphite of soda has been put on the plate : if the time has been too short, the glass will be covered with a transparent film of collodion, marked in some parts with a slight outline of the object ; if, on the contrary, it has been too long for a positive picture, a good negative may be the result ; but if the exposure has very much exceeded the proper limit, the plate will blacken

all over, under the influence of the developing solution.

I have now laid before the reader in all its details the mode of operating, which, in my hands, has proved the most successful, and it only remains for me to impress upon him the importance of scrupulous cleanliness in every stage of the process. The majority of the failures which discourage beginners arise from neglect in this particular.

All the measures, funnels, &c., employed, should be washed every time they are used. All the solutions must be kept in stoppered bottles : and whenever they require replenishing, the bottles should be rinsed with water ; or, in the event of their being stained, cleaned with dilute nitric acid (nitric acid one part, water two parts), before the fresh solutions are put into them.

To save the beginner some little trouble, I subjoin a list of the chemicals, with the relative quantities of each, which I should recommend him to procure :—

Tripoli powder	2oz.
Nitrate of silver	2oz.
Pyrogallic acid	1 drachm.
Acetic acid	2oz.

Nitric acid	1lb.
Nitrate of baryta	$\frac{1}{2}$ lb.
Protosulphate of iron	$\frac{1}{2}$ lb.
Hyposulphite of soda	1lb.
Hydrochlorate of ammonia	1oz.
Chloride of gold	30 grains.
Collodion	6 or 8oz.
Distilled water	1 gallon.
Amber varnish	2oz.

All these chemicals may be kept for a considerable length of time without injury, except the iodized collodion, which loses its sensitiveness by age. The better plan is to procure the collodion and the iodizing compound in separate bottles, and mix (in proportion directed by the maker) only the quantity requisite for one week's consumption, taking care that the bottle in which it is put is perfectly dry and clean.

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## APPENDIX.

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1. When this solution is newly made, the pictures produced frequently present a smoky appearance; this may be obviated by filling the bath a day before it is wanted, and putting into it a plate of glass, covered on both sides with collodion, and allowing it to remain there all night; the next day, remove the glass, and dip a piece of litmus paper into the solution, which, when withdrawn, ought to appear slightly reddened; should this not be the case, add to the bath one drop of nitric acid, and again test it; if one drop of acid does not prove sufficient, add another; but be careful not to put in too much, as the solution must be only slightly acid. When not in use, cover over the bath to keep the dust from its contents.

2. To avoid interrupting the detail of the process, a paragraph at the end of the book is devoted to an explanation of the necessary arrangements for placing the sitter in an advantageous position, and of the time requisite for the exposure of the plate.

3. The vessel used for pouring the hyposulphite solution on to the plate, must be employed for no other purpose, as the presence of the slightest trace of this salt in any other stage of the process, would completely spoil the result; in fact, the greatest care must be taken that none of the solutions become mixed in any shape or way.

4. Before commencing another picture, wipe your hands on a towel, to remove any traces of the chemicals employed, that may be adhering to them, and with a piece of blotting paper, remove from the inside of the dark frame, any moisture that



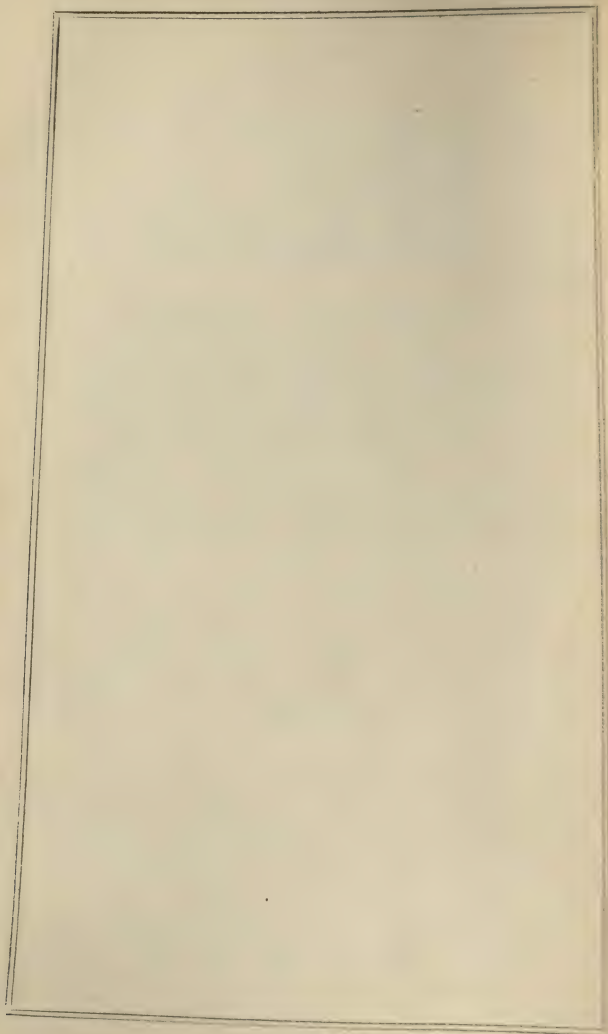
may have been left by the plate, when placed there, after its removal from the nitrate of silver bath.

5. The chloride of gold being deliquescent, should be preserved in the form of a solution; the best plan is to dissolve the contents of a 30 grain bottle, in 15 drachms of distilled water; a drachm of the solution will then contain two grains of the salt.

6. This is by far the best method of applying solutions to paper, as it insures a uniform distribution of the fluid over its surface; to avoid air bubbles which prevent the solution coming into contact with the paper wherever they occur, it is only necessary to take the sheet by two of its corners, dip the opposite end into the fluid, and then gradually lower it down, until it lies floating on its surface.

7. The chloride of silver may be formed for this purpose, by dissolving 60 grains of nitrate of silver in 2oz. of water, and then adding a solution of common table salt, until no more precipitate is thrown down. Allow it to settle, pour off the supernatant fluid and wash the precipitate, and then stand it in the sunshine to blacken.

FINIS.



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		$6\frac{1}{2}$ by $4\frac{3}{4}$	$8\frac{1}{2}$ by $6\frac{1}{2}$		
		2s. 3d.	2s. 9d.		

SHALLOW PORCELAIN DISHES, with Lips, from 1s.

IMPROVED AIR PUMP, with Receiver, for Stewart's  
method of Iodising Paper, with receiver, 3s. 6d.

Every variety of Colours in bottles, at 9d. each.

Scales with Weights complete, 3s.

Ditto ditto in Mahogany Case, 5s.

Ditto ditto superior, with Glass Pans, 7s. 6d.

Vertical Glass Troughs, or Nitrate of Silver Baths, with  
Mahogany Stand, No. 1, 2s., No. 2, 3s., No. 3, 5s. 6d.

**PLATES.***Per Dozen.*

Sizes.	30th.	40th.	Galvanized.	Birming- ham.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
2½ by 2	0 4 0	0 3 6	0 4 6	0 5 3
3½ by 2½	0 6 0	0 5 0	0 7 0	0 8 0
4 by 3	0 8 6	0 7 6	0 10 0	0 11 6
4½ by 3½	0 8 6	0 8 0	0 10 0	0 12 0
5 by 4	0 11 6	0 11 0	0 15 0	0 16 0
6½ by 4½	0 17 6	0 16 0	1 0 0	1 5 6
8½ by 6½	1 10 0	1 10 0	1 17 6	2 7 6

**PASSE PARTOUT.***Per Dozen.*

SIZES.	2½ by 2	3½ by 2½	4½ by 3½	5 by 4	6½ by 4½	6½ by 8
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Bevilled light, cushion, or oval shape, brown ground	2 6	3 0	3 6	5 9	6 9	14 0
Bevilled light, dome shape, brown ground .. ..	3 0	3 9	4 6	7 0	8 6	16 6
Bevilled light, cushion or oval, white ground .. ..	3 6	4 0	4 9	7 0	9 6	18 6
Do. do. dome shape	4 0	5 0	5 6	9 0	11 6	21 6
Bevilled light, gold ground cushion, oval or dome shape ..	9 0	10 0	11 0	16 6	23 0	
Artistic with white ground, particularly adapted for Calotype, oval, or cushion ..			9 0	10 0	12 0	17 6
Do. do. dome shape			10 0	11 0	12 6	17 6

Improved French Polished Mahogany Stereoscopes, with  
adjusting Lens and open ground glass backs, for Opaque  
or Transparent views, 10s. 6d.

A great variety of Daguerreotype, Albumen, and Calotype  
pictures, for the same, at the lowest prices.

*Country Orders must be accompanied by a remittance.*



# LIST OF PURE PHOTOGRAPHIC CHEMICALS,

PREPARED BY  
**WILLIAM BOLTON,**  
OPERATIVE & PHOTOGRAPHIC CHEMIST,  
146, HOLBORN BARS.

The following List embraces the principal Chemicals required for Photographic practice, all of which are prepared of the greatest purity, and expressly for that purpose; and every new preparation, as soon as known, may be obtained by applying as above.

## FOR CALOTYPE & COLLODION PROCESSES.

Acid, Acetic Glacial, or Crystallizable, pre- pared expressly for Photographic pur- poses ... .. oz.	0 9	Lead, pure Acetate ... ..	0 4
„ Gallic ... ..	1 9	Lead, pure Nitrate ... ..	0 6
„ Pyrogallic ... ..	18 0	Paper (Canson's), Neg. and Pos. per qre.	3s. and 4 6
„ Hydrochloric ... ..	0 2	„ Waxed ” & Iodized per sheet ... ..	1 0
„ Succinic ... ..	4 6	„ Sensitive, ready for the Camera ... ..	
„ Sulphuric ... .. lb.	0 4	„ (Whatman's, Turner's, and Nash's)	
„ „ pure ... .. oz.	0 2	„ White Bibulous per quire	1 6
Ammonia, pure; ... ..	0 2	Potash, Nitrate ... .. oz.	0 2
„ Bromide ... ..		Potassium, Bromide... ..	3 0
„ Iodide ... ..		„ Chloride... ..	0 6
„ Muriate ... ..	0 6	„ Cyanide ... ..	0 6
Barytes Nitrate ... ..	0 2	„ Fluoride... ..	2 0
Barium Chloride, pure ... ..	0 6	„ Iodide ... ..	2 0
Cadmium Bromide ... ..	10 0	Silver Nitrate, pure Crystals ... ..	5 0
Corrosive Sublimate... ..	0 6	„ Ammonio Nitrate Solution, ... ..	
Collodion ... ..	0 8	„ Iodide ... ..	8 0
Collodion, Iodized ... ..	0 9	„ Oxide ... ..	8 0
Ether, Sulphuric ... ..	0 8	„ Chloride ... ..	8 0
„ „ Washed ... ..	1 0	Soda, Hyposulphite; ... .. lb.	2 0
Gutta Percha Solution ... ..	0 8	Sodium, Fluoride ... .. oz.	2 0
Grape Sugar ... ..	0 4	Sugar Milk ... ..	0 4
Iron, Ammonio-Citrate ... ..	1 0	White Wax ... ..	0 3
„ Bromide ... ..	4 0		
„ Iodide ... ..	2 6		
„ Protonitrate ... ..	0 2		
„ Protosulphate, ... ..	0 2		

## IODIZING SOLUTION.

One drachm (or 60 drops) of this solution, added to 1 oz. of Collodion, renders it very sensitive; and the Collodion thus iodized remains good for nearly a fortnight. The above solution may be kept for any length of time, and exported to any climate without undergoing the slightest change. Per oz. 1s. 6d.

Crystal Varnish, for Collodion Negatives—hard, transparent, and dries instantaneously ... in bottles 1s. 6d. and 2s. 6d. each.

Amber Varnish for ditto ... .. oz. 1 6

Spirit Varnish and Gold Lacquer for ditto ... .. ” 0 4

Prepared Jet for the backs of Positives, in bottles, 6d. and 1s. each.

**Abstract**

W. B. will feel obliged by parties whenever they cannot come themselves, sending their orders in writing, *addressed to him*, and seeing that his name is upon every preparation.

